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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/591,299	08/31/2006	Susumu Noda	128699	9203
25944	7590	12/28/2009	EXAMINER	
OLIFF & BERRIDGE, PLC P.O. BOX 320850 ALEXANDRIA, VA 22320-4850				KIANNI, KAVEH C
ART UNIT		PAPER NUMBER		
		2883		
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			12/28/2009	
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/591,299	NODA ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	K. Cyrus Kianni	2883	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 14 August 2009.  
 2a) This action is **FINAL**.                  2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1-5 and 8-11 is/are pending in the application.  
 4a) Of the above claim(s) 2,3 and 8-11 is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1 and 4-5 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on 31 August 2006 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) <input type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date. _____ .
3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>9/10/09</u> .	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
	6) <input type="checkbox"/> Other: _____

## **DETAILED ACTION**

### **Claim Rejections - 35 USC § 103**

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tatsuya (JPP 2002-084037, cited/provided by the applicant as prior art 1449).

Tatsuya teaches a two-dimensional photonic crystal ,(see at least figures 1-9) having a slab-shaped body in which modified refractive index areas (see at least page 3-4 translation) are cyclically arranged (see at least fig. 1-3 and 6-9), the modified refractive index areas having the same shape and having a refractive index that differs from that of the body ,(see at least fig, 1-3, also at least parag. 0018, 0031), wherein a plane shape of each modified refractive index area is a polygon (see at least fig, 1-3 and 6-9, also at least parag. 0018, 0031); the corners are removed along an arc ,(see

at least fig, 1-3 and 6-9); the modified refractive index areas are arranged in a triangular lattice pattern; the polygon is an equilateral triangle (see at least fig, 1-3 and 6-9).

However, Tatsuya does not specifically state that the above modified refractive index areas having corners that are removed so that an area fraction FF of the modified refractive index areas in the body is equal to or larger than 0.5 and is equal to or smaller than 0.85 and/or from 3.15 to 3.55; and a radius  $r_a$  of the arc satisfies the equation stated in claim 1. Although the limitation 'corners are removed' is a process/method language and no patentable weight is given, nevertheless, Tatsuya states that etching process is carried out for forming the photonic crystal (see 0045), and that different refractive indices were used in the process (at least 0018), and that the diameter of the hole/arc is controllable by extending etching (see 0040). Further Tatsuya states a photograph nick crystal is arranging periodically the part where two or more kinds of refractive indexes' (dielectric constant's) differ, and controls the optical property (J. D.Joannnopoulous et al."Photonic Crystals"Princeton University Press). Also in light, the periodicity of the refractive index of wavelength extent produces a photograph nick band so that such a medium may be guessed, although Bragg reflection of the electron wave is carried out in the band formation theory of a semi-conductor and the dispersion relation of Energy E and the wave number k forms a band. Furthermore, the wavelength field where light cannot exist depending on the periodic structure, i.e., a photograph nick band gap, is formed. In order to control such a photograph nick band, several [ 1/] of the sizes of the wavelength of light are needed from wavelength extent of light as the structure period (see translation parag. 0018).

Furthermore, the applicant has admitted that Tatsuya photonic crystal area fraction FF is as high as 0.5 (see parag. 0010 of specification) in which it at least meets the low end of the claimed invention “equal to 0.5” (also admitted by the applicant in remarks/response page 5 that 0.5 FF is conventional) which is also smaller than 0.85.

Thus, it would have been obvious to a person of ordinary skill in the art when the invention was made to mere as a matter of design configuration to use different parameters for making the suggested photonic crystal since such modifications would provide comparatively simple, and controllability or repeatability process of making the photonic crystal (see 0005), and since it is been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233. and since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)

### ***Response to Arguments and Amendment***

Applicant's argument filed on 8/14/09 have been fully considered but they are not persuasive.

Applicant asserts that Tatsuya does not teach area fraction FF of the modified refractive index areas in the body is equal to or larger than 0.5 and is equal to or smaller than 0.85 and/or from 3.15 to 3.55; and a radius  $r_a$  of the arc satisfies the equation stated in claim 1. Nonetheless, Tatsuya states that different refractive indices were used in the process (at least 0018), and that the diameter of the hole/arc is controllable by extending etching (see 0040). Further Tatsuya states a photograph nick crystal is arranging periodically the

part where two or more kinds of refractive indexes' (dielectric constant's) differ, and controls the optical property (J. D.Joannnopoulous et al."Photonic Crystals"Princeton University Press). Also in light, the periodicity of the refractive index of wavelength extent produces a photograph nick band so that such a medium may be guessed, although Bragg reflection of the electron wave is carried out in the band formation theory of a semi-conductor and the dispersion relation of Energy E and the wave number k forms a band. Furthermore, the wavelength field where light cannot exist depending on the periodic structure, i.e., a photograph nick band gap, is formed. In order to control such a photograph nick band, several [ 1/] of the sizes of the wavelength of light are needed from wavelength extent of light as the structure period (see translation parag. 0018).

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***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to K. Cyrus Kianni whose telephone number is 571-272-2417. The examiner can normally be reached on 9:30-19:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on 571-272-2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Kianni C Kaveh/

Primary Examiner, Art Unit 2883

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November 25, 2009